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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,748	11/19/2003	Ronald G. Polcawich	ARL 03-09	7460
37064	7590	06/29/2006	EXAMINER	
OFFICE OF COMMAND COUNSEL, U.S. ARMY MATERIEL COMMAND ATTN: AMCCC-B-IP 9301 CHAPEK ROAD FORT BELVOIR, VA 22060-5527			NGUYEN, SANG H	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 06/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/716,748	POLCAWICH ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Sang Nguyen	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 19 November 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date: _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>11/19/03</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Information Disclosure Statement***

The information disclosure statement (IDS) submitted on 11/19/2003 has been entered. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

**Regarding claim 1;** the language of the present invention "a thin-film, membrane microphone formed on one of the outer layers and acoustically coupled to the resonant cavity" is not clear. For purpose examination, the examiner considered the phrase "a thin-film, membrane microphone" is replace "a thin-film membrane microphone".

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

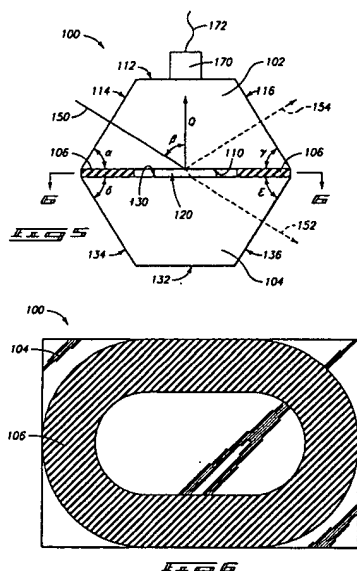
**Claims 1-2, 7, and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Autrey et al (U.S. Patent No. 6,348,968).**

**Regarding claims 1 and 12;** Autrey et al discloses an integrated photoacoustic spectroscopy cell and method, comprising:

the photoacoustic spectroscopy cell (100 of figure 5) includes a multi-layer structure (102, 106, 104 of figure 5) having an inner layer (106 of figure 5 is shim material) disposed between top and bottom outer layers (i.e. first block material [102 of figure 5] and second block material [104 of figure 5]), with the inner layer (106 of figure 5) being patterned to form a resonant cavity (center sample reservoir [120 of figure 5]); and

a thin-film membrane microphone or sensor/detector (i.e., a transducer is preferably an acoustic microphone and col.2 line 50 to col.3 line 12; and col.8 line 66 to col.9 lines 5) formed on one of the outer layers (102 of figure 7) and acoustically coupled to the resonant cavity (120 of figure 7).

U.S. Patent Feb. 19, 2002 Sheet 3 of 7 US 6,348,968 B2



**Regarding claim 2;** Autrey et al discloses the resonant cavity (120 of figure 5) is an open-tube resonant cavity to receive light from source (150 of figure 5).

**Regarding claim 7;** Autrey et al discloses the microphone (170 of figure 7) is acoustically coupled to the resonant cavity (120 of figure 7) through an acoustic port (185 of figure 7) in communication with the resonant cavity (120 of figure 7).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

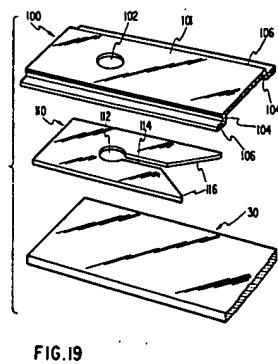
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 3-4, 8, and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Autrey et al (U.S. Patent No. 6,348,968) in view of Oberhardt (U.S. Patent No. 5,110,727).**

**Regarding claims 3-4 and 13-14;** Autrey et al discloses all of features of claimed invention except for buffer cavities on either side thereof and one or both of the top and bottom outer layers being patterned to include a portion of the buffer cavities on either side of the resonant cavity. However, Oberhardt teaches that it is known in the art to provide buffer cavities (22, 26, 24 of figure 14) of the inner layer (20 of figure 16) on either side thereof of the top and bottom layer (10, 30 of figure 16) and one or both of the top and bottom outer layers (10, 30 of figure 16) being patterned to include a portion

of the buffer cavities (14, 12 of figure 13) of the top layer (10 of figure 13) on either side of the resonant cavity (22, 26, 24 of figure 14). See figures 13-17 and 19.

U.S. Patent May 8, 1992 Sheet 13 of 31 5,110,727



U.S. Patent May 8, 1992 Sheet 11 of 31 5,110,727

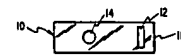


FIG. 13

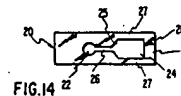


FIG. 14

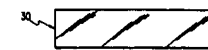


FIG. 15

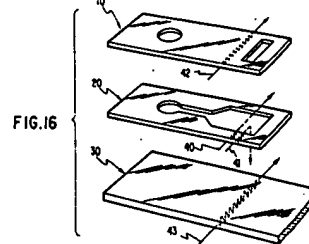


FIG. 16

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine device of Autrey et al with buffer cavities on either side thereof and one or both of the top and bottom outer layers being patterned to include a portion of the buffer cavities on either side of the resonant cavity as taught by Oberhardt for the purpose of performing accurately and reproducible coagulation assay of sample with minimum sample manipulation.

**Regarding claim 8;** Autrey et al discloses all of features of claimed invention except for the layers are silicon wafers. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine device of Autrey et al with the layers are made of silicon wafers, since it has been held to be within the

general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

**Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Autrey et al (U.S. Patent No. 6,348,968) in view of Drzewiecki (U.S. Patent No. 6,286,360).**

**Regarding claim 6;** Autrey et al in view of Oberhardt disclose all of features of claimed invention except for the thin film microphone is a piezoelectric microphone. However, Drzewiecki teaches that it is known in the art to provide the thin film microphone is a piezoelectric microphone (col.4 lines 54-63). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine device of Autrey et al with a the thin film microphone is a piezoelectric microphone as taught by Drzewiecki for the purpose of low cost pressure drop flow element, the pressure drop across which is related to the flow rate, density and viscosity of the gas mixture.

**Claims 5 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Autrey et al in view of Oberhardt as applied to claims 1-3 and 12-13 above, and further in view of Ueno et al (U.S. Patent No. 6,600,558).**

**Regarding claim 5 and 15;** Autrey et al in view of Oberhardt discloses all of features of claimed invention except for gas inlet and outlet ports through one or both of the outer layers and into the buffer cavities. However, Ueno et al teaches that it is known in the art to provide optical cell (7 of figure 3) having gas inlet and outlet ports (figure 3) through one or both of the outer layers and into the buffer cavities (figures 3-

4). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine device of Autrey et al with gas inlet and outlet ports through one or both of the outer layers and into the buffer cavities as taught by Ueno et al for the purpose of determining accurately of quantitative concentration gas.

**Claims 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Autrey et al (U.S. Patent No. 6,348,968) in view of Autrey et al (6,244,101).**

**Regarding claim 16;** Autrey et al ('968) discloses all of features of claimed invention except for step of depositing a piezoelectric thin film onto one of the outer substrates, patterning the thin film to create an acoustic sensor, and forming a port from the acoustic sensor into the resonant cavity. However, Autrey et al ('101) teaches that it is known in the art to provide step of depositing a piezoelectric thin film (i.e., [102, 104 of figure 2] piezoelectric material such as ceramic, polymer and combination and see col.3 lines 13-19) onto one of the outer substrates (202, 204 of figure 2), patterning the thin film to create an acoustic sensor /detector (col.,5 lines 11-15), and forming a port from the acoustic sensor into the resonant cavity (figures 1C and 2). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine device of Autrey et al ('968) with depositing a piezoelectric thin film onto one of the outer substrates, patterning the thin film to create an acoustic sensor, and forming a port from the acoustic sensor into the resonant cavity as taught by Autrey et al ('101) for the purpose of increasing selectivity with no reduction in sensitivity.

**Regarding claim 17;** Autrey et al ('968) discloses all of features of claimed invention except for the piezoelectric thin film is lead zirconate titanate (PZT). It would



have been obvious to one having ordinary skill in the art at the time the invention was made to combine device of Autrey et al ('968) with the piezoelectric thin film is lead zirconate titanate (PZT), since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

**Regarding claim 18;** Autrey et al ('968) discloses all of features of claimed invention except for the piezoelectric thin film is aluminum nitride (AlN). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine device of Autrey et al ('968) with the piezoelectric thin film is aluminum nitride (AlN), since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

**Regarding claim 19;** Autrey et al ('968) discloses all of features of claimed invention except for the piezoelectric thin film is zinc oxide (ZnO). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine device of Autrey et al ('968) with the piezoelectric thin film is zinc oxide (ZnO), since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

**Regarding claim 20;** Autrey et al ('968) discloses all of features of claimed invention except for the layers are silicon wafers. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine device of

Autrey et al ('968) with the layers are made of silicon wafers, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

**Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Autrey et al (U.S. Patent No. 6,348,968) in view of Olsen et al (U.S. Patent No. 4,096,602).**

**Regarding claim 21-22;** Autrey et al ('968) discloses all of features of claimed invention except for joining the inner substrate to a pair of outer substrates includes the use of temperature and pressure to create a gold-silicon eutectic bond. However, Olsen et al teaches that it is known in the art to provide joining the inner substrate (50 of figure 5) to a pair of outer substrates (64 of figure 5) includes the use of temperature and pressure to create a gold-silicon eutectic bond (col.4 lines 30-58 and col.5 lines 36-49). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine device of Autrey et al ('968) with joining the inner substrate to a pair of outer substrates includes the use of temperature and pressure to create a gold-silicon eutectic bond as taught by Olsen et al for the purpose of aligning and bonding the layers together by heating treating the stacked layers at the temperature sufficient to produce self-diffusion bonding and metalizing the conductor path.

**Claims 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Autrey et al (U.S. Patent No. 6,348,968) in view of Oberhardt (U.S. Patent No. 5,110,727).**

**Regarding claim 9;** Autrey et al discloses an integrated photoacoustic spectroscopy cell, comprising:

the photoacoustic spectroscopy cell (100 of figure 5) includes a structure (102, 106, 104 of figures 5 and 7) including an inner layer (106 of figure 5) sandwiched between top and bottom outer layers (102, 104 of figure 5);

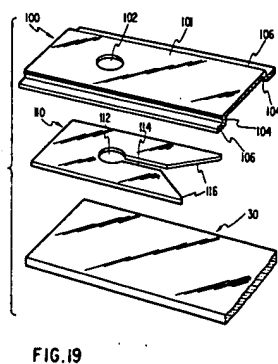
the inner layer (106 of figure 5) being patterned to include an open-tube resonant cavity (center sample reservoir [120 of figure 5]); and

a piezoelectric thin-film sensor (i.e., a transducer is preferably an acoustic microphone and col.2 line 50 to col.3 line 12; and col.8 lines 66 to col.9 lines 5) formed on one of the outer layers (102, 104 of figure 7) and a port acoustically coupling the sensor to the resonant cavity (120 of figure 7). See figures 1-13.

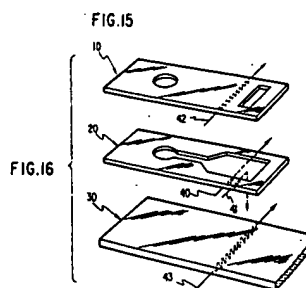
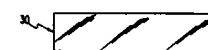
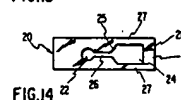
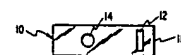
Autrey et al discloses all of features of claimed invention except for buffer cavities on either side thereof and one or both of the top and bottom outer layers being patterned to include a portion of the buffer cavities on either side of the resonant cavity. However, Oberhardt teaches that it is known in the art to provide buffer cavities (22, 26, 24 of figure 14) of the inner layer (20 of figure 16) on either side thereof of the top and bottom layer (10, 30 of figure 16) and one or both of the top and bottom outer layers (10, 30 of figure 16) being patterned to include a portion of the buffer cavities (14, 12 of

figure 13) of the top layer (10 of figure 13) on either side of the resonant cavity (22, 26, 24 of figure 14). See figures 13-17 and 19.

U.S. Patent May 8, 1992 Sheet 13 of 31 5,110,727



U.S. Patent May 8, 1992 Sheet 11 of 31 5,110,727



Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine device of Autrey et al with buffer cavities on either side thereof and one or both of the top and bottom outer layers being patterned to include a portion of the buffer cavities on either side of the resonant cavity as taught by Oberhardt for the purpose of performing accurately and reproducible coagulation assay of sample with minimum sample manipulation.

**Regarding claim 11;** Autrey et al discloses all of features of claimed invention except for the layers are silicon wafers. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine device of Autrey et al with the layers are made of silicon wafers, since it has been held to be within the

general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

**Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Autrey et al in view of Oberhardt as applied to claim 9 above, and further in view of Ueno et al (U.S. Patent No. 6,600,558).**

**Regarding claim 10;** Autrey et al in view of Oberhardt discloses all of features of claimed invention except for gas inlet and outlet ports through one or both of the outer layers and into the buffer cavities. However, Ueno et al teaches that it is known in the art to provide optical cell (7 of figure 3) having gas inlet and outlet ports (figure 3) through one or both of the outer layers and into the buffer cavities (figures 3-4). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine device of Autrey et al with gas inlet and outlet ports through one or both of the outer layers and into the buffer cavities as taught by Ueno et al for the purpose of determining accurately of quantitative concentration gas.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Autrey et al (6870626) discloses array based photoacoustic spectroscopy; Pilgrim et al (6608683) discloses acoustic resonance phase locked photoacoustic spectrometer; Jourdain et al (6344647) discloses miniaturized photoacoustic spectrometer; Dussault et al (6188474) discloses optical spectroscopy sample cell; Blatt et al (4761381) discloses volume metering capillary gap device; or Rosencwaig (4028932) discloses photo acoustic cell.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sang Nguyen whose telephone number is (571) 272-2425. The examiner can normally be reached on 9:30 am to 7:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

June 24, 2006

  
Sang Nguyen  
Patent Examiner  
Art Unit 2877